

CLAIMS

What is claimed is:

1. In a plasma processing system, a method of inspecting a contact opening of a contact formed in a first layer of said substrate to determine whether said contact reaches a metal layer that is disposed below said first layer comprising:
 - flowing a gas mixture into a plasma reactor of said plasma processing system, said gas mixture comprising a flow of a chlorine containing gas;
 - striking a plasma from said gas mixture;
 - exposing said contact to said plasma; and
 - detecting whether metal chloride is present in said contact after said exposing.
2. The method of claim 1, wherein said detecting includes observing said metal chloride using a microscope.
3. The method of claim 1, wherein said detecting includes observing said metal chloride using a top down SEM technique.
4. The method of claim 1, wherein said chlorine containing gas is Cl_2 .
5. The method of claim 1, wherein said chlorine containing gas is BCl_3 .
6. The method of claim 1, wherein said chlorine containing gas is CH_3Cl .
7. The method of claim 1, wherein said chlorine containing gas is CHF_2Cl .
8. The method of claim 1, wherein said chlorine containing gas is HCl .
9. The method of claim 1, wherein said chlorine containing gas is HBr .
10. The method of claim 1, wherein said chlorine containing gas is Br_2 .

11. The method of claim 1, wherein said chlorine containing gas is CuCl_2 .
12. The method of claim 1, wherein said chlorine containing gas is Cu_xCl_y , where x and y are integers.
13. The method of claim 1, wherein said set of metals comprises essentially of Cu.
14. The method of claim 1, wherein said set of metals comprise essentially of Al.
15. The method of claim 1, wherein said flow of a chlorine containing gas is more preferably between about 1 % and about 100% of a total flow of said gas mixture.
16. The method of claim 1, wherein said flow of a chlorine containing gas is more preferably between about 10 % and about 80 % of a total flow of said gas mixture.
17. The method of claim 1, wherein said flow of a chlorine containing gas is most preferably about 50% of a total flow of said gas mixture
18. The method of claim 1, wherein said plasma processing system employs a bias power setting of about 2 MHz.
19. The method of claim 1, wherein said plasma processing system employs a RF power setting of about 27 MHz.
20. The method of claim 1, wherein said plasma processing system employs a RF power setting of about 60 MHz.
21. In a plasma processing system, an apparatus for inspecting a contact opening of a contact formed in a first layer of said substrate to determine whether said contact reaches a metal layer that is disposed below said first layer comprising:
 - a means of flowing a gas mixture into a plasma reactor of said plasma processing system, said gas mixture comprising a flow of a chlorine containing gas;

a means of striking a plasma from said gas mixture;
a means of exposing said contact to said plasma; and
a means of detecting whether metal chloride is present is said contact after said exposing.

22. The apparatus of claim 1, wherein said detecting includes observing said metal chloride using a microscope.

23. The apparatus of claim 1, wherein said detecting includes observing said metal chloride using a top down SEM technique.

24. The apparatus of claim 1, wherein said chlorine containing gas is Cl_2 .

25. The apparatus of claim 1, wherein said chlorine containing gas is BCl_3

26. The apparatus of claim 1, wherein said chlorine containing gas is CH_3Cl

27. The apparatus of claim 1, wherein said chlorine containing gas is CHF_2Cl .

28. The apparatus of claim 1, wherein said chlorine containing gas is HCl .

29. The apparatus of claim 1, wherein said chlorine containing gas is HBr .

30. The apparatus of claim 1, wherein said chlorine containing gas is Br_2 .

31. The apparatus of claim 1, wherein said chlorine containing gas is CuCl_2 .

32. The apparatus of claim 1, wherein said chlorine containing gas is Cu_xCl_y , where x and y are integers.

33. The apparatus of claim 1, wherein said set of metals comprises essentially of Cu.

34. The apparatus of claim 1, wherein said set of metals comprise essentially of Al.
35. The apparatus of claim 1, wherein said flow of a chlorine containing gas is more preferably between about 1 % and about 100% of a total flow of said gas mixture.
36. The apparatus of claim 1, wherein said flow of a chlorine containing gas is more preferably between about 10 % and about 80 % of a total flow of said gas mixture.
37. The apparatus of claim 1, wherein said flow of a chlorine containing gas is most preferably about 50% of a total flow of said gas mixture
38. The apparatus of claim 1, wherein said plasma processing system employs a bias power setting of about 2 MHz.
39. The apparatus of claim 1, wherein said plasma processing system employs a RF power setting of about 27 MHz.
40. The apparatus of claim 1, wherein said plasma processing system employs a RF power setting of about 60 MHz.